

N OAA'S Climate Services

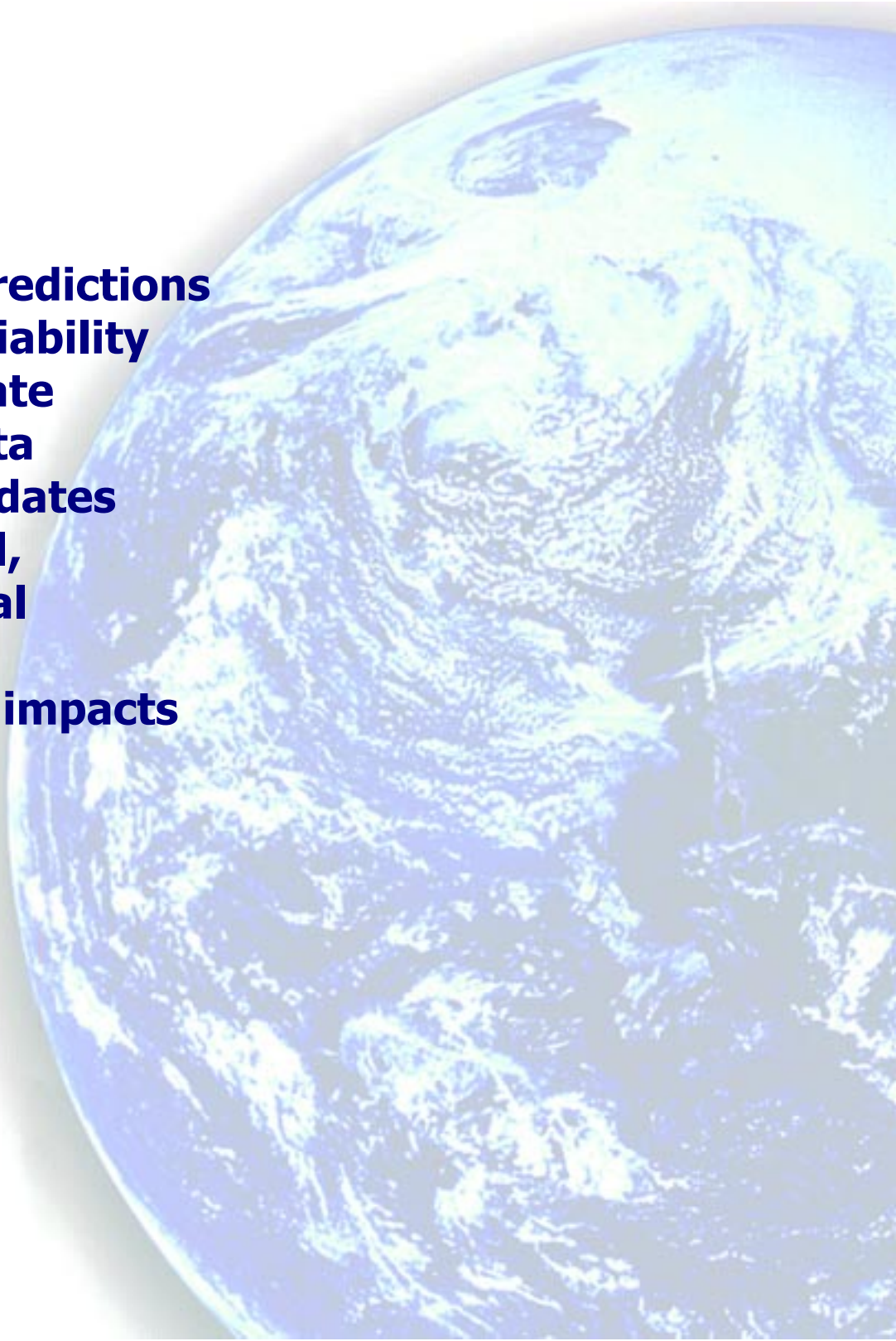


PROVIDING

**Climate change predictions
Predictions of variability
and future climate
Global climate data
Climate status updates
Regional, national,
and international
assessments
Understanding of impacts**

ENABLED BY

**Observations
Research
Modeling
Partnerships**



NOAA's Climate Observations and Services Program

The nation needs accurate, comprehensive, and timely information about climate variability, climate change, and climate uncertainties.

NOAA's Climate Observations & Services Program is an "end-to-end" endeavor designed to *obtain* and *deliver* climate information, thereby providing an improved basis for climate-related decision-making. NOAA's climate information is founded on observations taken on the ground, in the air, and from space. That foundation supports a core of focused research, analysis, and modeling that yields climate updates, climate forecasts, impacts assessments, and other products that are broadly termed services. Each of these components - carried out in conjunction with partners in industry, academia, and other agencies - is critical to the success of NOAA's Climate Observations & Services Program.

Climate Observing

Observations are the foundations of climate services. Both *in-situ* and satellite observations are necessary to address climate needs. Data must be collected from the important elements of the full climate system for a comprehensive view to allow optimal monitoring, prediction, and services. Archiving of the data is critical, as many of the important uses of the data will be years into the future.

What do we observe?

Ocean temperature, salinity, wave heights, sea level, tides, circulation

Atmospheric temperature, pressure, humidity, precipitation, winds, chemical composition

Greenhouse gas trends, sources, and sinks

Climate history prior to direct measurements

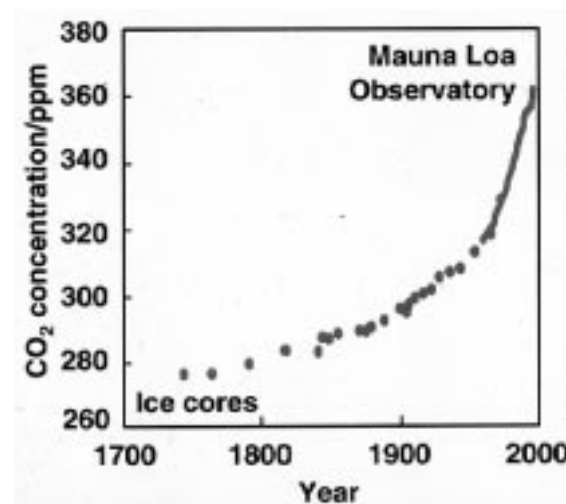
How do we observe it?

Satellites, oceanic research ships, moored and drifting buoys, ocean profiling floats, ocean reference stations, hydrographic lines

Satellites, weather balloons, surface sampling, research aircraft

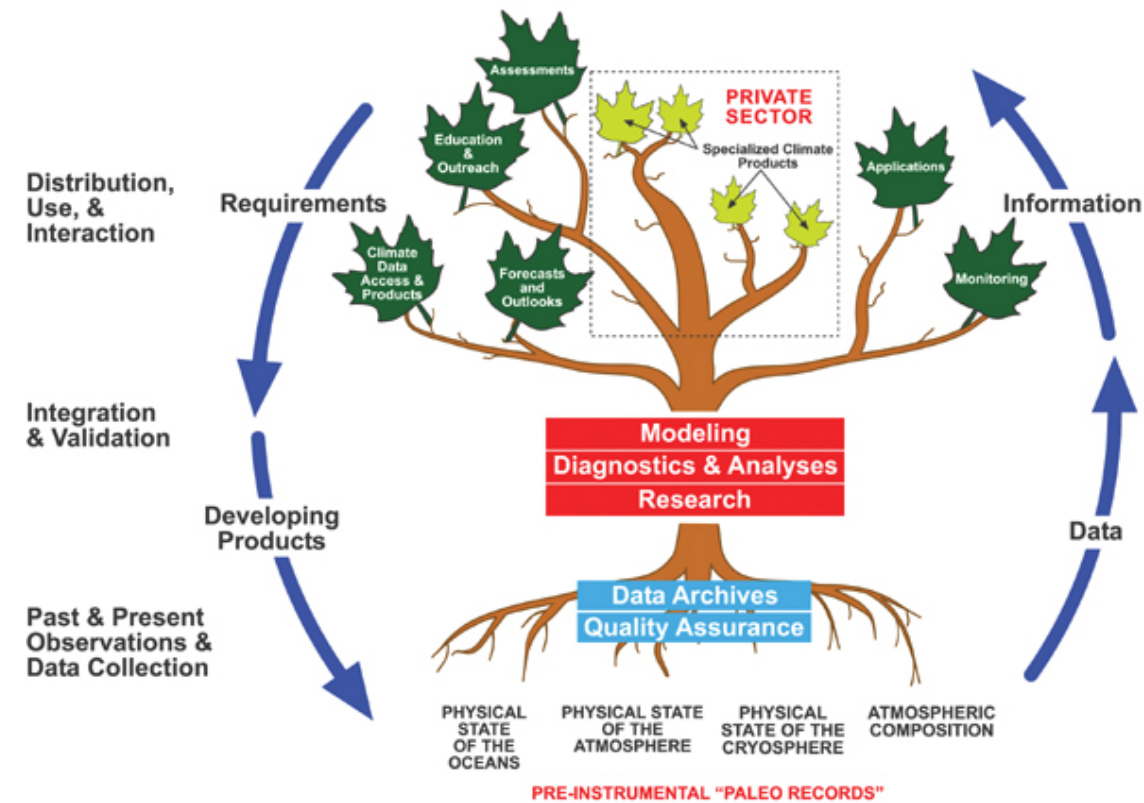
In-situ monitoring sites, focused field studies, satellites

Tree rings, corals, ice cores, lake and ocean sediments, pollen data, historical documents



33% increase in carbon dioxide since pre-industrial times

NOAA's Climate Services



Products and Services

NOAA collects and provides to users daily and monthly data, time series, and maps for various climate parameters, such as precipitation, temperature, snow cover, and degree days for the United States and other parts of the world. In addition, NOAA compiles data on atmospheric and oceanic conditions, including El Niño/Southern Oscillation (ENSO); other climate patterns such as the North Atlantic and Pacific Decadal Oscillations; and stratospheric ozone and temperature. NOAA provided the official climate normals and climate information that are the basis for reducing the impact of extreme weather and climate events. Forecasts, assessments, state-of-the-atmosphere reports, climate change scenarios, climate monitoring results, enhanced research and applications - these are what complete the full suite of products of the NOAA Climate Observations & Services Program.

Research and Modeling

Research, including diagnostics and analysis, and computer modeling provide the means to reveal connections between oceans, land, and atmosphere. The physical and biological dimensions of such connections help answer critical policy-relevant questions about climate variability and climate change along with their consequences.

Research topics and aims

Climate Variability: Seeking to describe several recurring large-scale patterns of variability that interact to influence our climate on a regional scale such as El Niño/Southern Oscillation.

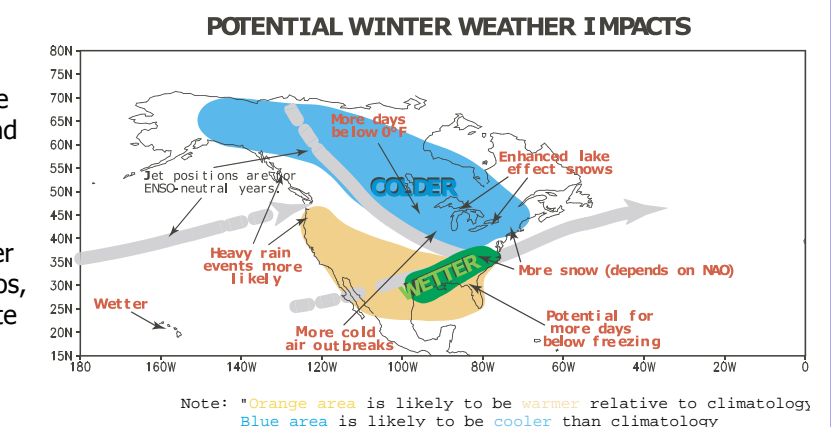
Water Cycle: Seeking a better understanding of the global water cycle - one of the most significant aspects of climate research and services because water is a critical driver for most climate processes, and its availability underlies effective natural resource management.

Atmospheric Chemistry and Aerosols: Seeking to understand the chemical and radiative processes associated with trace chemicals in the atmosphere.

Carbon Cycle: Seeking to improve our ability to predict the fate of anthropogenic carbon dioxide (CO₂) and future atmospheric CO₂ concentrations using a combination of atmospheric and oceanic global observations, process-oriented field studies and modeling.

The Role of Modeling

The nation has come to expect forecasts out to a week or so, resulting from weather forecasting models. For longer-range forecasts, models are used to predict seasonal-to-interannual climate variability, as well as to simulate climate change over decades to centuries. To assure continued improvement of these climate forecasts, NOAA has a strong program that involves both universities and internal efforts.



Note: "Orange area is likely to be warmer relative to climatology
Blue area is likely to be cooler than climatology

U.S. Winter Climate Outlook

Partnerships, Education, and Outreach

NOAA uses an array of resources to produce climate information for different regions. These include regional consortia of local **university and government experts**, along with the professional **meteorologists, hydrologists, and climatologists** of the local weather and river forecast offices.

NOAA maintains **partnerships** with universities, private industry, other US agencies, nations, and international bodies to observe the climate, to gather information from the data, and to make and assess predictions of climate.

NOAA also works closely with its **private sector partners** NOAA also works closely with its private sector partners to develop products that meet needs and to ensure that the data and information delivered are readily understood and can be used to develop value-added tailored products and services for business and industry. For example, the weather risk industry uses many of the products and data NOAA provides to hedge against unusual weather and climate conditions. **Consulting climatologists** make extensive use of NOAA's data and information to address specific issues related to various business applications like marketing, insurance claims, building design efficiencies, transportation needs, agribusiness issues, and many other applications.

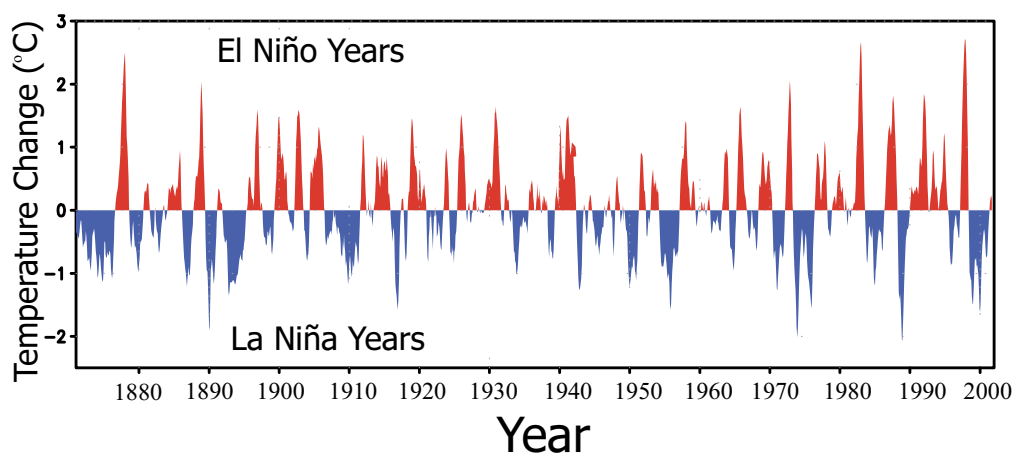
Why the Climate Observations & Services Program?

An integrated, or "end-to-end", climate service for the nation requires that NOAA have a unified strategy for transitioning research into systematic and sustained outreach. NOAA's Climate Observations and Services benefits from participation by several components of the organization. The **National Weather Service** provides the official forecast and dissemination system as well as real-time monitoring; the **National Environmental Satellite, Data and Information Service** contributes space-based observations, climate monitoring, data archiving and dissemination; and the **Office of Oceanic and Atmospheric Research** brings research, monitoring, modeling, and assessment that builds a science-based knowledge of the climate system.



Climate Reference
Network Station

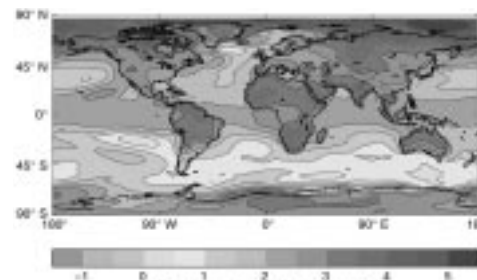
NOAA maintains indices of
climate variability



Why NOAA?

NOAA has a proven track record in conducting atmospheric and oceanic research, weather services, and environmental satellite and data services that forms the scientific basis for effective decision making. Based on its unique capabilities and defined contributions, constructive mix of research and service entities, and management and scientific advice, NOAA is uniquely qualified in the effort to develop long-term systematic climate observations, products, and services.

Projected Changes in Annual Temperatures (degrees C) for the 2050s



For further information, contact:

Dr. David Goodrich
NOAA Climate Observations and Services Program
Silver Spring, Maryland
david.goodrich@noaa.gov

Fall 2001